upper end 64 of the crank portion 62*a* of the support plate 61. This turns the support plate 61 towards its retracted position against the spring force of the spring 66 Before the cam plate 123 reaches its retracted position, the image pick-up unit 21 is moved off the photographing optical path as shown by two-dot chain lines in FIG 4 The cam plate 123 is provided with a slit 123*d* in which part of the image pick-up unit 21 can move so as not to interfere with the cam plate 123 when it moves to its retracted position.

Rotation of the zoom motor 116 in the retracting direction causes the rear barrel 104 and the rear lens group L2 to retreat towards their retracted positions previously occupied by the image pick-up unit 21 (refer to FIG 1C)

Rotation of the zoom motor 116 in the advancing direction causes the rear barrel 104 and the rear lens group L2 to move forwardly, which causes the cam plate 123 to move towards the telephoto extremity position thereof, i e, in a direction apart from the barrel block 101 The movement of the cam plate 123 in this direction moves the pusher 123c away from the upper end 64 of the crank portion 62*a* of the support plate 61. This causes the support plate 61 to turn towards its photographing position through the spring force of the spring 66. Further movement of the cam plate 123 causes the image pick-up unit 21 to move into the photographic optical path, where the rear barrel 104 and the rear lens group L2 are already absent When the cam plate 123 reaches its wide-angle extremity position, the pusher 123c leaves the upper end 64 of the crank portion 62*a* Consequently, the spring 66 brings the support plate 61 into contact with the locating pin 67 While the zoom lens 11 is driven to effect zooming and focusing, the cam plate 123 moves within a range where its pusher 123c is apart from the upper end 64 of the crank portion 62*a*, so that the image pick-up unit 21 remains in the photographing position, where the spring 66 holds the support plate 61 to contact the locating pin 67.

After the power switch (not shown) of the camera shown in FIG. 4 is turned off, the zoom motor 116 rotates in the retracting direction to retract the lens barrels 103 and 104 At the same time, the cam plate 123 slides in the retracting direction This first turns the support plate 61 toward its retracted position to move the image pick-up unit 21 out of the photographing optical path After the image pick-up unit 21 moves off the photographing optical path, the rear barrel 104 moves into the position previously occupied by the image pick-up unit 21 Consequently, the rear end of the rear barrel 104 or the rear lens group L2 moves rearwardly to a position close to the inner surface 13 of the camera body (see FIG 1 (C))

As can be understood from the foregoing, according to the digital camera to which the present invention is applied, when the photographic lens retreats in the camera body, the image pick-up unit 21, which is positioned behind the photographic lens, is moved out of the photographic optical path to secure the space behind the lens in which the rear end of the photographic lens can further retreat It is therefore possible to reduce the thickness of the camera body, or lengthen the movable lens barrel in order to increase the zoom ratio

In each of the first and second embodiments, although the image pick-up unit 21 is secured to the support plate (41 or 61) which is pivoted about the shaft (43 or 63) extending parallel to the optical axis O so as to move the image pick-up unit 21 into and out of the photographic optical path, the image pick-up unit 21 can be guided in a direction perpendicular to the optical axis so as to be driven to linearly move into and out of the photographic optical path

In each of the first and second embodiments, the zoom lens 11 and the image pick-up unit 21 can be driven by different motive power sources

Obvious changes may be made in the specific embodiments of the present invention described herein, such modifications being within the spirit and scope of the invention claimed It is indicated that all matter contained herein is illustrative and does not limit the scope of the present invention

What is claimed is:

1 A digital camera comprising:

a photographic lens movable along an optical axis thereof between a retracted position and a photographing position in front of said retracted position;

image pick-up device on which an object image is formed through said photographic lens, said image pick-up device being guided to be movable between a first position where said image pick-up device is positioned in a photographic optical path of said photographic lens behind said photographic lens and a second position where said image pick-up device is positioned out of said photographic optical path; and

a mechanism for moving said image pick-up device between said first position and said second position, wherein said moving mechanism moves said image pick-up device to said first position when said photographic lens is moved from said retracted position to said photographing position, and wherein said moving mechanism moves said image pick-up device to said second position when said photographic lens is moved from said photographing position to said retracted position.

2 The digital camera according to claim 1, wherein said image pick-up device is guided in a direction perpendicular to said optical axis

3 The digital camera according to claim 1, wherein said moving mechanism moves said image pick-up device from said first position to said second position before said photographic lens reaches said retracted position.

4. The digital camera according to claim 3, wherein a rear end of said photographic lens moves into a space previously occupied by said image pick-up device when said photographic lens moves from said photographing position to L1 said retracted position

5 The digital camera according to claim 1, wherein said moving mechanism comprises a support plate to which the image pick-up device is secured, said support plate being pivoted about a shaft secured to a body of said digital camera so that said image pick-up device is movable between said first position and said second position.

6. The digital camera according to claim 5, wherein said shaft extends parallel to said optical axis

7. The digital camera according to claim 1, wherein said photographic lens comprises:

a lens barrel movable along said optical axis between said retracted position and said photographing position; and

a photographic optical system comprising a front lens group and a rear lens group, at least said rear lens group being supported by said movable lens barrel;

wherein said moving mechanism further comprises an interlocking mechanism, provided between said image pick-up device and said movable lens barrel, for moving said image pick-up device between said first position and said second position in association with the movement of said movable lens barrel between said photographing position and said retracted position

8. The digital camera according to claim 5, wherein said moving mechanism further comprises a spring for continuously urging said support plate in a direction to move said image pick-up device to said first position

9. The digital camera according to claim 5, wherein said photographic lens is a motor-driven zoom lens, said moving mechanism further comprises:

a cam plate guided in a direction perpendicular to the optical axis, said cam plate being moved in association with the movement of said photographic lens; and

an interlocking mechanism, provided between said image pick-up device and said cam plate, for moving said image pick-up device between said first position and said second position in association with the movement of said cam plate.

10. The digital camera according to claim 9, further comprising:

a zoom finder which varies a magnification thereof in association of the variation of a focal length of said photographic lens, said zoom finder comprising at least one movable lens group having a follower,

wherein said cam plate comprises a cam slot in which said follower is fitted.

11. The digital camera according to claim 10, further comprising:

a strobe which varies an angle of illumination thereof in association of said variation of said focal length of said photographic lens, said strobe comprising a movable light emitting unit having a second follower,

wherein said cam plate comprises a second cam slot in which said second follower is fitted.

12. The digital camera according to claim 7, wherein said moving mechanism further comprises a support plate to which the image pick-up device is secured, said support plate being pivoted about a shaft secured to a body of said digital camera so that said image pick-up device is movable between said first position and said second position,

wherein said interlocking mechanism comprises:

a link bar pivoted about a shaft secured to said camera body, one end of said link bar having a follower, the other end of said link bar engaging with said support plate; and

a cam groove formed on said movable lens barrel, said follower being fitted in said cam groove.

13. A digital camera having a retractable photographic lens, comprising:

an image pick-up device on which an object image is focused through said photographic lens; and

a mechanism for positioning said image pick-up device in a photographic optical path of said photographic lens behind said photographic lens when a power switch of said digital camera is turned ON, and for positioning said image pick-up device out of said photographic optical path when said power switch is turned OFF.

14. (new) A method for operating a camera having a barrel and a plurality of optical elements, the method comprising:

moving the barrel along an optical axis between and including a plurality of photographic positions and at least one position in which no photograph can be taken;

positioning all of the optical elements along the optical axis when the barrel is in one of the plurality of photographic positions; and

positioning at least one optical element of the plurality of optical elements out of the optical axis and at least another optical element of the plurality of optical elements along the optical axis, such that at least a portion of the at least one optical element and at least a portion of the at least another optical element are located along a plane which is generally perpendicular to the optical axis, when the barrel is in the at least one position in which no photograph can be taken.

15. (new) The method according to claim 14, wherein the at least one optical element is an image pick-up device.

16. (new) The method according to claim 15, wherein the image pick-up device is a charge-coupled device.

17. (new) The method according to claim 14 wherein the plurality of optical elements includes at least one lens and an image pick-up device.

18. (new) The method according to claim 17, wherein the image pick-up device is a charge-coupled device.

19. (new) The method according to claim 14, wherein the plurality of optical elements includes an image pick-up device and a plurality of lenses.

20. (new) The method according to claim 19, wherein the image pick-up device is a charge-coupled device.

21. (new) The method according to claim 14, further comprising moving a finder in association with movement of the barrel within the plurality of photographic positions.

22. (new) The method according to claim 14, wherein the plurality of photographic positions comprises a zoom range.

23. (new) A method for operating a camera having a barrel and a plurality of imaging elements, the method comprising:

moving the barrel along an optical axis between and including a plurality of photographic positions and at least one position in which no photograph can be taken;

positioning all of the imaging elements along the optical axis when the barrel is in one of the plurality of photographic positions; and

positioning at least one imaging element of the plurality of imaging elements out of the optical axis and at least another imaging element of the plurality of imaging elements along the optical axis, such that at least a portion of the at least one imaging element and at least a portion of the at least another imaging element are located along a plane which is generally perpendicular to the optical axis, when the barrel is in the at least one position in which no photograph can be taken.

24. (new) The method according to claim 23, wherein the at least one imaging element is an image pick-up device.

25. (new) The method according to claim 24, wherein the image pick-up device is a charge-coupled device.

26. (new) The method according to claim 23, wherein the plurality of imaging elements includes at least one lens and an image pick-up device.

27. (new) The method according to claim 26, wherein the image pick-up device is a charge-coupled device.

28. (new) The method according to claim 23, wherein the plurality of imaging elements includes an image pick-up device and a plurality of lenses.

29. (new) The method according to claim 28, wherein the image pick-up device is a charge-coupled device.

30. (new) The method according to claim 23, further comprising moving a finder in association with movement of the barrel within the plurality of photographic positions.

31. (new) The method according to claim 23, wherein the plurality of photographic positions comprises a zoom range.

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